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ABSTRACT

The 90-hour course is a foundation quinmester course in welding for the auto body repairman. The outline consists of three blocks of instruction (orientation, 6 hours; oxyacetylene welding equipment, 10 hours; and auto body oxyacetylene welding, 74 hours), each of which is subdivided into several units listing student competencies. Instruction will consist of demonstrations, lectures, group discussions, audiovisual aids, and resource people from industry. Instruction should be flexible to meet individual needs and abilities. A bibliography lists three basic references, five supplementary references, and two films. A 25-item multiple choice posttest sample is included. (SC)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

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Course Outline
AUTOMOTIVE BODY REPAIR AND REFINISHING 1 - 9033
(Auto Body Welding I)
Department 48 - Quin 9033.03

DE001426

DADE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION • 1973

ED 092697

D A D E C O U N T Y P U B L I C S C H O O L S

1450 NORTHEAST SECOND AVENUE

M I A M I, F L O R I D A 33132

Course Outline

AUTOMOTIVE BODY REPAIR AND REFINISHING 1 - 9033
(Auto Body Welding I)

Department 48 - Quin 9033.03

county office of

VOCATIONAL AND ADULT EDUCATION

THE SCHOOL BOARD OF DADE COUNTY

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Dr. E. L. Whigham, Superintendent of Schools
Dade County Public Schools
Miami, Florida 33132

January, 1973

Published by the School Board of Dade County

COURSE DESCRIPTION

9033	48	9033.03	AUTO BODY WELDING I
State Category Number	County Dept. Number	County Course Number	Course Title

This quinmester course is designed as only one of a group of quinmester courses offered in the field of auto body repair. The student will receive the general information, technical knowledge, basic skills involved in the use of gas welding equipment, including running of beads, position welding, cutting and brazing, and leading common metals, including sheet metal, steel and iron used in the automotive industry. All phases of soldering and spot welding is covered.

This is a one or two quinmester credit course.

Indicators of success: The applicant must demonstrate an eighth grade equivalency score in reading and math; also have average ability in mechanical aptitudes.

Clock Hours: 90

PREFACE

The following quinmester course outline is a guide to help students become employable with skills, knowledge, attitudes and values necessary for performing the required service of the automotive body repairman.

This course is designed as a foundation quinmester course in welding for the auto body repairman. This outline consists of three blocks of instructions which are subdivided into several units each. It is only one part of a series of quinmester outlines designed for the complete auto body repairman. This course is 90 hours in length.

Prerequisites for this course is as follows: The student should have an eighth grade equivalency score in reading, comprehension, arithmetic fundamentals and mechanical aptitude. The student must be physically and mentally able to profit from this training.

Prior to entry into this course, the vocational student will display mastery of the skills indicated in Body Construction and Trim (9033.02).

Instruction will consist of demonstrations, lectures, group discussions, audio visual aids and resource people from industry. Instruction will be flexible to meet individual needs and abilities.

The bibliography appearing on the last page of this outline lists several basic references, also supplementary references and audio visual aids.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee and Vocational Curriculum Materials Service and has been approved by the Dade County Vocational Curriculum Committee.

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with Suggested Hourly Breakdown

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GOALS

The Auto Body Repair trainee must be able to:

1. Demonstrate an understanding of oxyacetylene welding equipment.
2. Exhibit the ability to assemble and disassemble the oxyacetylene welding outfit.
3. Demonstrate an understanding of the major components of the oxyacetylene welding outfit.
4. Demonstrate an understanding of welding and brazing sheet metal.
5. Perform the welding of sheet metal in the flat, vertical horizontal positions.
6. Demonstrate an understanding of oxyacetylene cutting.
7. Perform cutting of sheet metal with the oxyacetylene cutting torch.
8. Satisfactorily complete the post test.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - ORIENTATION

The student must be able to:

1. List shop rules by written assignment.
2. List safety rules by written assignment.
3. Explain what will be expected of him in the auto body welding repairs by oral or written assignment.
4. List the opportunities that are available for a career in the auto body occupation by written assignment.
5. Exhibit pride and respect for craftsmanship by his actions in the shop or laboratory.
6. Demonstrate an understanding and acceptance of his duties and responsibilities by his performance in the shop or laboratory.

BLOCK II - OXYACETYLENE WELDING EQUIPMENT

The student must be able to:

1. Define the general types and components of welding equipment by identification test.
2. List the materials used for oxyacetylene welding of sheet metal by written assignment.
3. List the types and sizes of welding rods used for oxyacetylene welding by written assignment.
4. List the types of welding fluxes used in oxyacetylene welding process by written assignment.
5. List the components of the oxyacetylene cutting torch by written assignment.

BLOCK III - AUTO BODY OXYACETYLENE WELDING

The student must be able to:

1. Demonstrate an understanding of oxyacetylene welding equipment by written assignment.
2. Exhibit the ability to choose the proper equipment to do the job at hand by performance in the shop.
3. Exhibit the ability to assemble and disassemble the oxyacetylene welding outfit by performance in the shop.
4. Define the chemical and physical laws that affect metal when doing welding by written assignment.
5. Exhibit the ability to weld sheet metal with minimum distortion by performance in the shop.
6. Demonstrate an understanding of welding and brazing sheet metal.
7. Perform the welding of sheet metal in the flat, vertical and horizontal positions by performance in the shop.
8. Exhibit the ability to braze sheet metal in the flat, vertical and horizontal positions by performance in the shop.
9. Demonstrate an understanding of the safety precautions in the use of the oxyacetylene welding outfit by written assignment.

10. Demonstrate an understanding of oxyacetylene cutting torches and components by oral examination.
11. Exhibit the ability to cut sheet metal with the oxyacetylene cutting torch by performance in the shop.
12. Demonstrate an understanding of the care and maintenance of the oxyacetylene cutting torch and components by oral examination.
13. List the protective clothing worn when cutting sheet metal with the oxyacetylene cutting torch by written assignment.
14. Demonstrate an understanding of the safety precautions in the use of the oxyacetylene cutting torch by oral assignment.

BLOCK IV - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

Course Outline

AUTOMOTIVE BODY REPAIR AND REFINISHING 1 - 9033
(Auto Body Welding I)

Department 48 - Quin 9033.03

I. ORIENTATION

A. Objectives of Course
   1. Standards
   2. Methods of evaluation
      a. Oral test
      b. Written test
      c. Manipulation
      d. Diagnosis and job performance
   3. Teaching methods

B. Student Benefits
   1. Opportunities for employment
      a. Job opportunities
      b. Scope of trade
   2. Qualification for employment
      a. Job competency
      b. Attitude
      c. Dependability
      d. Pride of workmanship
      e. Experience
      f. Trade certificate
      g. Foundation for more education and training

C. Student Responsibilities
   1. Safety regulations
   2. School policies and expenses
   3. Shop rules and procedures
      a. Use and care of equipment
      b. Care of hand tools
      c. Appropriate dress
      d. Reporting loss of equipment
      e. Housekeeping
      f. Reporting defective equipment
      g. Materials and supplies
      h. Employer-employee relations
      i. Employee-customer relations

II. OXYACETYLENE WELDING EQUIPMENT

A. Welding and Cutting Assembly
   1. Type and sizes
   2. Manufacture
      a. Torch
      b. Tip
      c. Gauges
      d. Hoses
      e. Accessories
      f. Cart

II. OXYACETYLENE WELDING EQUIPMENT (Contd.)

B. Welding Materials
   1. Oxygen
   2. Acetylene
      a. Manufacture
      b. Method
      c. Size
   3. Welding rods
      a. Sizes
      b. Steel
      c. Brass
      d. Cast iron
      e. Aluminum
      f. Solder
   4. Welding fluxes
      a. Brazing
      b. Cast iron
      c. Aluminum
      d. Solder

III. AUTO BODY OXYACETYLENE WELDING

A. Oxyacetylene Welding Theory and Processes
   1. Types
   2. Methods
   3. Safety precautions
      a. Assembling the welding outfit
      b. Adjustments
      c. Flashback
      d. Combustion
      e. Metal properties
      f. Protective clothing
      g. Welding goggles
      h. Care and maintenance
      i. Welding sheet metal
      j. Brazing
      k. Flat position
      l. Vertical position
      m. Horizontal position
      n. Spot welding

B. Oxyacetylene Cutting Process
   1. Types
   2. Methods
   3. Safety precautions
      a. Hand Torch
      b. Machine
      c. Adjustments
      d. Combustion
      e. Metal properties

III. AUTO BODY OXYACETYLENE WELDING (Contd.)

f. Care and maintenance
g. Protective clothing
h. Welding goggles

IV. QUINMESTER POST TEST

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(Auto Body Welding I)

Basic References:

1. Frazee, Irving, and Spicer, Edward D. Automotive Collision Work, Chicago: American Technical Society, 1963. Pp. 355.

2. Sargent, L. Robert. Automotive Sheet Metal Repair, Philadelphia: Chilton Co., 1963. Pp. 423.

3. Study Guide for Automotive Collision Work. Revised Ed. Chicago: American Technical Society, 1956. Pp. 67.

Supplementary References:

4. Althouse, A.D., and Turnquist, C.H. Modern Welding Practice. Chicago: The Goodheart-Wilcox Co., Inc., 1958. Pp. 510.

5. Giachino, J.W., and Others. Welding Skills and Practices. Chicago: American Technical Society, 1960. Pp. 279; 1965 ed. Pp. 303.

6. Jefferson, T.B., and Woods, Gorham. Metals and How to Weld Them. Cleveland: The James F. Lincoln Arc Welding Foundation, 1955. Pp. 322.

7. Rossi, Boniface E. Welding and Its Application. New York: McGraw-Hill Book Co., Inc. 1941. Pp. 343.

8. Toboldt, Bill. Autobody Repairing and Repainting. Chicago: The Goodheart-Wilcox Co., Inc., 1969. Pp. 224.

Films:	Dade County Number
1. Oxyacetylene Welding, Light Metal. 16 mm. 21 min. B/W. Sound. 1944. United World Films, Inc.	592
2. Know Your Car. 16 mm. 15 min. B/W. Sound. 1945. United World Films, Inc.	293

A P P E N D I X

QUINMESTER POST-TEST SAMPLE

QUINMESTER POST-TEST

NAME_____ DATE_____ SCORE_____

The following items are multiple choice. Select the one you believe correct. Circle the letter provided at left of item.

1. Welding is the process of joining metal by the use of:

   a. force
   b. heat
   c. screws
   d. rivets

2. The proper type of flame for welding sheet metal is:

   a. oxidizing flame
   b. carburizing flame
   c. neutral flame
   d. none of above

3. The melting point of steel is approximately:

   a. 600°
   b. 1550°
   c. 3600°
   d. 2600°

4. Metal right next to the bead of a weld is:

   a. weaker than the weld
   b. stronger than the weld
   c. same strength as the weld
   d. none of above

5. The oxygen and acetylene regulators are:

   a. interchangeable
   b. not interchangeable
   c. both left hand threads
   d. both right hand threads

6. Oxygen hoses are usually:

   a. red in color
   b. yellow in color
   c. blue in color
   d. green in color

7. Acetylene hoses are usually:

   a. red in color
   b. yellow in color
   c. blue in color
   d. green in color

8. Most welding torches consist of three basic units:

   a. oxygen regulator, handle, tip
   b. torch handle, mixing head, welding tip
   c. regulator, handle, hose, tip
   d. regulator, hose, tip

9. Oil or grease:

   a. should be used to lubricate the torch tip
   b. can be used to lubricate the regulators only
   c. should be used on rusty welding equipment
   d. should never be used on oxyacetylene welding equipment under any circumstances

10. When lighting the oxyacetylene torch, the oxygen cylinder valve should be opened:

    a. one-half turn
    b. all the way
    c. one turn
    d. any of above

11. When lighting the oxyacetylene torch, the acetylene cylinder valve should be opened:

    a. one-half turn
    b. all the way
    c. three turns
    d. any of the above

12. The approximate temperature of the oxyacetylene flame used for welding is:

    a. 7500°
    b. 2300°
    c. 5850°
    d. 212°

13. In welding light sheet metal, the safest distance to hold the inner cone of the welding flame from the puddle is:

    a. slightly less than the length of the cone
    b. twice the length of the cone
    c. at least two inches away
    d. three inches away

14. Brazing is best suited for:

a. areas requiring much strength
b. welding aluminum
c. butt joints
d. overlapped seams

15. The difference between brazing and fusion welding is:

a. less heat is needed for brazing
b. not as much strength is acquired in brazing
c. a brass or bronze rod is used in brazing
d. all of the above are true

16. One difference between brazing and fusion welding is:

a. less heat is needed for fusion welding
b. a flux must be used for brazing
c. brazing is best suited for butt welding
d. metal does not have to be as clean for brazing

17. The oxygen regulator and hose has:

a. left hand threads
b. double threads
c. right hand threads
d. none of the above

18. In making a simple butt weld on flat stock, the angle of the flame to the puddle should be between:

a. 30° and 45°
b. 80° and 90°
c. 5° and 10°
d. none of the above

19. The best angle to hold the filler rod to the surface being welding is approximately:

a. 5°
b. 10°
c. 45°
d. 90°

20. The advantage of tack welding is:

a. prevents misalignment of metal pieces being welded
b. less heat is used
c. separation of the metal pieces being welded
d. all of the above

21. When setting up the oxyacetylene welding outfit, the oxygen and acetylene cylinder valve should be opened and closed quickly to:

a. check the valves for leaks
b. blow out any dirt, dust or foreign matter from the valves
c. relieve excess pressure in the tanks
d. none of the above

22. Cutting sheet metal with an oxyacetylene cutting torch is:

a. a slow method of cutting sheet metal
b. a fast method of cutting sheet metal
c. impossible
d. none of the above

23. The four small holes in the cutting tip are:

a. oxygen jet holes
b. acetylene jet holes
c. air jet holes
d. pre-heat holes

24. The center hole in the cutting tip is the:

a. oxygen hole
b. acetylene jet hole
c. air hole
d. none of the above

25. When cutting sheet metal, the jet of oxygen is regulated by the:

a. acetylene valve
b. preheat holes
c. cutting oxygen lever
d. all of the above

QUINMESTER POST-TEST ANSWER SHEET

1. b
2. c
3. d
4. a
5. b
6. d
7. a
8. b
9. d
10. b
11. a
12. c
13. a
14. d
15. d
16. b
17. c
18. a
19. c
20. a
21. b
22. b
23. d
24. a
25. c

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